

PATENT COOPERATION TREATY

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REC'D 02 JUN 2006

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P459PC00	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2005/000162	International filing date (day/month/year) 08-02-2005	Priority date (day/month/year) 09-02-2004
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Mederio AG et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (sent to the applicant and to the International Bureau) a total of 6 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 20-07-2005	Date of completion of this report 10-05-2006
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Anette Hall/MP Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000162

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Cover sheet

International patent classification (IPC)

B65B 1/36 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000162

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☐

the international application in the language in which it was filed

☐

a translation of the international application into _____,
which is the language of a translation furnished for the purposes of:

☐

international search (Rules 12.3(a) and 23.1(b))

☐

publication of the international application (Rule 12.4(a))

☐

international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐

the international application as originally filed/furnished

☒

the description:

pages 1 - 25 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒

the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 26 - 31 received by this Authority on 21 - 04 - 2006

pages* _____ received by this Authority on _____

☒

the drawings:

pages 1 - 13 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐

the description, pages _____

☐

the claims, Nos. _____

☐

the drawings, sheets/figs _____

☐

the sequence listing (*specify*): _____

☐

any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐

the description, pages _____

☐

the claims, Nos. _____

☐

the drawings, sheets/figs _____

☐

the sequence listing (*specify*): _____

☐

any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000162

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-24</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-24</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-24</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The invention concerns an apparatus for receiving powder, an apparatus for volumetric production of doses of dry powder, a method of transporting powder during filling and a method of producing doses of dry powder. One objective of the invention is to make exact doses of powder.

Documents cited in the International Search Report:

D1: US 5826633 A
D2: US 2655301 A
D3: US 20030011957 A1
D4: US 2670101 A
D5: GB191313509 A
D6: WO 03062064 A2

The cited documents represent the general state of the art.
The inventions defined in the amended claims 1-24 are not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed apparatus for transporting dry powder, the apparatus for production of doses of dry powder, the method of transporting dry powder and the method of producing doses of dry powder. Therefore, the claimed inventions are not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-24 are novel and are considered to involve an inventive step. The inventions are industrially applicable.

CLAIMS

1. An apparatus for transporting dry powder from an external bulk powder source to a dose filling tool during volumetric filling of metered doses, the apparatus is **characterized by**

5 a feeding chamber device having at least one inlet adapted for receiving portions of dry powder from the external bulk powder source and at least one outlet adapted for dispensing powder to the dose filling tool;

an internal volume of the feeding chamber device is designed to hold a limited amount of powder representing a limited number of doses, and the
10 feeding chamber device is designed to be replenished intermittently with powder from the external bulk powder source for maintaining a level of powder in the internal volume within specified limits over many cycles of volumetric dose filling;

the feeding chamber device and the dose filling tool are arranged to be
15 movable in relation to each other while the at least one outlet of the feeding chamber device is forcibly in contact with a surface of the dose filling tool during the relative movement, the relative movement providing shearing and frictional forces on a pillar of powder in the internal volume of the feeding chamber device, thereby assisting in providing a coherent plug of powder
20 within the feeding chamber device; and

the feeding chamber device constitutes an independent, intermediate device, separating the bulk powder source from the dose filling tool.

2. The apparatus according to claim 1, **characterized in** that

25 the feeding chamber device comprises at least one energizable member, when energized capable of collapsing a body of powder in the feeding chamber device into a homogeneous plug of powder and separating the plug of powder from having generally contact with the inner surface of the feeding chamber device.

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3. The apparatus according to claim 3, **characterized in** that

the energizable member comprises at least one scraper member movable relative the feeding chamber device.

4. An apparatus for volumetric production of doses of dry powder, the apparatus is **characterized by**

a bulk powder source containing the powder and comprising means for releasing portions of the powder;

a feeding chamber device comprising at least one inlet adapted for receiving portions of powder from the bulk powder source and at least one outlet adapted for dispensing powder to at least one powder metering receptacle of the dose filling tool;

the dose filling tool and the at least one outlet of the feeding chamber device are arranged for being movable in relation to each other such that the at least one outlet of the feeding chamber device is forcibly in contact with a surface of the dose filling tool during the relative movement; and

air suction means adapted for applying air suction power to fill the at least one metering receptacle with a dose of the powder when the at least one outlet of the feeding chamber device crosses the at least one metering receptacle during the relative movement,

wherein the feeding chamber device constitutes an independent, intermediate device, separating the bulk powder source from the dose filling tool.

5. The apparatus according to claim 4, **characterized in** that the surface of the dose filling tool comprising the at least one metering receptacle is plane.

6. The apparatus according to claim 4, **characterized in** that a filter is applied to the at least one metering receptacle such that powder particles are not lost to air being sucked during filling of the at least one metering receptacle.

7. The apparatus according to claim 6, **characterized in** that the filter is a woven filter.

8. The apparatus according to claim 4, **characterized in** that the
5 mechanical strength of the filter is re-enforced by arranging at least one of a supporting wire netting at one or optionally both sides of the filter or a supporting sintered filter at one or optionally both sides of the filter.

9. The apparatus according to claim 4, **characterized in** that a spring
10 force is applied to keep contact pressure between an air nozzle, the filter and an opening of the at least one metering receptacle for sucking air, such that elastic seals sealing the nozzle, the filter and at least one metering receptacle will stop leakage of air and powder into and out of the at least one metering receptacle.

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10. The apparatus according to claim 4, **characterized in** that a source of electric charges is arranged in an air gap between the dose filling tool and a dose container, such that electrically charged particles in an ejected powder load become electrically neutralized while being transferred from at least one
20 metering receptacle to the dose container.

11. The apparatus according to claim 4, **characterized in** that sources of electric charges are arranged at a working distance to the bulk powder source and optionally at a working distance to the powder in the feeding
25 chamber device and to the dose filling tool in order to electrically neutralize electrostatic charges of the powder and the apparatus.

12 The apparatus according to claim 4, **characterized by** air pressure means adapted for applying air pressure power to eject a metered dose of
30 powder from the at least one metering receptacle when the receptacle is in a position for emptying into a dose container.

13. A method of transporting dry powder from an external bulk powder source to a dose filling tool during volumetric filling of metered doses, **characterized by:**

5 intermittently feeding a portion of powder from the external bulk powder source to a feeding chamber device through at least one inlet of the feeding chamber device, the feeding chamber device being designed for containing a limited amount of powder representing a limited number of doses, and comprising at least one outlet adapted for dispensing powder to the dose filling tool; and

10 providing a relative movement between the feeding chamber device and the dose filling tool while the at least one outlet of the feeding chamber device is in forcible contact with a surface of the dose filling tool during the relative movement, the relative movement providing shearing and frictional forces on a pillar of powder in the feeding chamber device, thereby assisting
15 in providing a coherent plug of powder within the feeding chamber device,

wherein the feeding chamber device constitutes and an independent, intermediate device, separating the external bulk powder source from the dose filling tool and transporting the dry powder from the external bulk powder source to the dose filling tool.

20 14. The method according to claim 13, **characterized by** the further step of energizing at least one energizable member in the feeding chamber device, when energized capable of collapsing a body of powder in the feeding chamber device into a homogeneous plug of powder and generally separating
25 the body of powder from having contact with the inner surface of the feeding chamber device.

15. The method according to claim 14, **characterized in** that the at least one energizable member comprises at least one scraper member movable
30 relative the inside of the feeding chamber device.

16. A method of producing volumetric doses of dry powder, **characterized by:**

intermittently replenishing as required a portion of powder from a bulk powder source to at least one inlet of a feeding chamber device;

5 providing a relative movement between the feeding chamber device and a dose filling tool comprising at least one powder metering receptacle such that at least one outlet of the feeding chamber device crosses the at least one metering receptacle in such a way that the at least one outlet is in forcible contact with a surface of the dose filling tool; and

10 applying air suction power to fill the at least one metering receptacle with a dose of the powder from the feeding chamber device when the at least one outlet of the feeding chamber device crosses the at least one metering receptacle,

15 wherein the feeding chamber device constitutes an independent, intermediate device, separating the bulk powder source from the dose filling tool and the applied air suction to the metering receptacle.

17. The method according to claim 16, **characterized in** that the surface of the filling tool is plane.

20 18. The method according to claim 16, **characterized by** the further step of applying a filter to the at least one metering receptacle such that powder particles are not lost to air being sucked during filling of the receptacle.

25 19. The method according to claim 16, **characterized by** the further step of re-enforcing the mechanical strength of the filter by arranging at least one of a supporting wire netting at one or optionally both sides of the filter or a supporting sintered filter at one or optionally both sides of the filter.

30 20. The method according to claim 16, **characterized by** the further step of applying a spring force to obtain contact pressure between an air nozzle, the filter and an opening of the at least one metering receptacle for sucking

air, such that elastic seals sealing the nozzle, the filter and the at least one metering receptacle will stop leakage of air and powder into and out of the receptacle.

5 21. The method according to claim 16, **characterized by** the further step of arranging a source of electric charges in an air gap between the filling tool and a dose container, such that electrically charged particles in an ejected powder load become electrically neutralized while being transferred from the at least one metering receptacle to the dose container.

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22. The method according to claim 16, **characterized by** the further step of arranging sources of electric charges at a working distance to the bulk powder source and optionally at a working distance to the powder in the feeding chamber and to the filling tool in order to accomplish that
15 electrostatic charges of the powder and the apparatus become electrically neutralized such that the filling process is not adversely affected.

23. The method according to claim 16, **characterized by** the further step of applying air pressure powder to eject a metered dose of powder from the
20 at least one metering receptacle when the receptacle is in a position for emptying into a dose container.

24. The method according to claim 16, **characterized in** that a mass target of the doses is in arrange of 100 µg – 50 mg, and preferably in a range of 100
25 µg – 10 mg and most preferably in a range of 100 µg – 5 mg.

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